

Amendments to the Claims

This listing of claims will replace all prior versions, or listings, of claims in the application.

Listing of Claims:

Claims 1-8 canceled.

9. (original) Rotationally mergeable MEMS apparatus comprising the combination of:
an electronic circuit module having a MEMS active element controlling output electrode disposed in an upper layer output location thereof;

a mating MEMS active element module having an electromagnetic field movable active element disposed in an exposed, said output electrode corresponding, location thereof, said MEMS active element module including module supporting flexible tensile members connected with a substrate hinge-mounted sacrificial MEMS active element module support element;

a MEMS active element module physical support element latching member movably mounted on said substrate and disposable in a position of mutually locked engagement with said substrate hinge mounted MEMS active element module support element in a selected off-chip and rotated about said hinge location thereof adjacent said electronic circuit module.

10. (original) The rotationally mergeable MEMS apparatus of claim 9 wherein said MEMS active element module physical support element includes a slider element engageable with a tongue portion of said MEMS active element module physical support element in said position of mutually locked engagement.

11. (original) The rotationally mergeable MEMS apparatus of claim 9 wherein said MEMS active element module physical support element latching member is comprised of semiconductor materials included in said MEMS active element module.

12. (original) The rotationally mergeable MEMS apparatus of claim 9 wherein said MEMS active element module physical support element latching member, said module supporting flexible tensile members, said hinge-mounted sacrificial MEMS active element module support element and said MEMS active element module are comprised of silicon semiconductor materials.

Claims 13-20 canceled.

21. (new) MEMS rotational latching hinge apparatus comprising the combination of:
a MEMS active element module having a electromagnetic field responsive active element received in an exposed location thereof, said module comprising a plurality of active layers overlying a sacrificial substrate member;

a MEMS active element module protection member also residing in said plurality of active layers overlying said sacrificial substrate member in a location laterally displaced from said MEMS active element module, said MEMS active element module protection member exceeding said MEMS active element module in lateral extents;

said MEMS active element module protection member including a plurality of module edge received hinge elements connecting said protection member with said sacrificial substrate member;

said MEMS active element module protection member further including an electively releasable anchor apparatus connected with said substrate member and holding portions of said module in close proximity with said substrate member until electively released;

a plurality of flexible tether members also residing in said plurality of active layers overlying said sacrificial substrate member and extending between said MEMS active element module and said MEMS active element module protection member;

a MEMS active element module protection member latching assembly additionally residing in said plurality of active layers overlying said sacrificial substrate member in a selected lateral distance separation from said MEMS active element module protection member, said latching assembly including a lengthwise movable MEMS active element module protection member stabilization arm having an end portion connectable with a protrusion from said MEMS active element module protection member following a hinge rotation enabled off-chip positioning of said MEMS active element module protection member and said MEMS active element module; and

tensioned lifting beam apparatus disposed in said active layers adjacent said MEMS active element module protection member and engageable with said MEMS active element module protection member to perform initial separating of said MEMS active element module protection member from said substrate upon release of said MEMS active element module protection member from said anchor element.

22. (new) The MEMS rotational latching hinge apparatus of claim 21 wherein said MEMS active element module protection member latching assembly is comprised of two layers of structural semiconductor material disposed in removed intermediate oxide layer-achieved physical segregation.

23. (new) The MEMS rotational latching hinge apparatus of claim 22 wherein said MEMS active element module protection member latching assembly is comprised of two layers of structural semiconductor material disposed in a cross sectional pattern having first layer portions separated from overlying second layer portions by a sliding separation gap in one location thereof and said same first layer portions coupled to overlying second layer portions in another location thereof.

24. (new) MEMS rotational latching apparatus for electively connecting a first MEMS element with an adjacently disposed movable second MEMS element, said latching apparatus comprising the combination of:

a substrate member portion of said first MEMS element, said substrate member having a layer of first structural material received thereon and a layer of second structural material received over said first structural material layer;

an elongated slide member derived from said layer of first structural material;
a slider head portion connected with said elongated slide member, derived from coupled portions of said layer of first structural material and said layer of second structural material and held in guided sliding captivity with respect to said substrate member;

a sliding cap member derived from said layer of second structural material and movable over a selectable portion of said elongated slide member;

said sliding cap member including a receptacle portion engageable with a tongue portion of said adjacently disposed second MEMS element in one sliding position thereof along said elongated slide member; and

said elongated slide member and said sliding cap member being each movable with respect to said substrate member and with respect to said second MEMS element in response to application of external movement forces.

25. (new) The MEMS latching apparatus of claim 24 wherein:

said substrate member is comprised of silicon semiconductor material having a first oxide covered polysilicon layer received thereon and a second oxide covered polysilicon layer received over said first oxide covered polysilicon layer;

said elongated slide member is comprised of first polysilicon layer material;
said slider head member connected with said elongated slide member is comprised of attached portions of said first polysilicon layer material and said second polysilicon layer material and held in guided sliding captivity with respect to said silicon semiconductor substrate member;
said sliding cap member is comprised of said second polysilicon layer material and movable over a selectable portion of said elongated slide member;

said sliding cap member includes a cross sectional portion received in extended captivity with respect to said silicon semiconductor substrate member along said elongated slide member;

said sliding cap member includes a receptacle portion engageable with a tongue portion of said adjacently disposed second MEMS element in one sliding position thereof along said elongated slide member; and

said elongated slide member and said sliding cap member are each movable with respect to said silicon semiconductor substrate member and with respect to said second MEMS element in response to application of external movement forces.

26. (new) The MEMS rotational latching apparatus of claim 24 wherein said movable second MEMS element comprises a hinge-pivoted header member portion of said electromechanical MEMS module.

27. (new) The MEMS latching apparatus of claim 25 wherein said first polysilicon layer oxide covering layer remains trapped intermediate slider head portions of said first polysilicon layer and said second polysilicon layer and forms a stiffening increasing element.

28. (new) The MEMS latching apparatus of claim 25 wherein said elongated slide member of said first polysilicon layer includes an etch removed fabrication-sequence oxide layer of selected thickness for releasing said slide member from said substrate member into a movable condition.

29. (new) The MEMS latching apparatus of claim 25 wherein said apparatus includes first and second stop elements connected with said silicon semiconductor substrate member and limiting sliding movement of said slider head member.

30. (new) The MEMS latching apparatus of claim 25 wherein said slider head member and said sliding cap member each engage second polysilicon layer derived guide rail elements connected with said silicon semiconductor substrate member.

31. (new) The MEMS latching apparatus of claim 25 wherein said slider head member includes a recess region disposed to receive said external movement forces and said external movement forces are applied through a portable probe tip member to said recess region.